STATEMENT OF

JOHN O'BRIEN, DIRECTOR

ENGINEERING AND AIR SAFETY DEPARTMENT

AIR LINE PILOTS ASSOCIATION, INTERNATIONAL

BEFORE

THE SUBCOMMITTEE ON AVIATION

OF THE

SENATE COMMITTEE ON COMMERCE, SCIENCE AND

TRANSPORTATION

MARCH 25, 1999

MODERNIZATION OF THE AIR TRAFFIC CONTROL (ATC) SYSTEM

Air Line Pilots Association, Int'l.
1625 Massachusetts Avenue, NW
Washington, DC 20036
(202) 797-4033

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Good Morning. Mr. Chairman, I am John O'Brien, Director of the Engineering and Air Safety Department of the Air Line Pilots Association (ALPA). ALPA represents the professional interests of 52,000 pilots who fly for 51 airlines in the United States and Canada. We appreciate the opportunity to appear before you today to discuss the issue of air traffic control modernization.

There are three primary reasons that ALPA believes that the FAA must move forward with deliberate speed to modernize the air traffic control system. All three support the

goal of improving the safety of all ATC operations and, in particular, air carrier operations.

First, as we all are aware, some of the air traffic control equipment is old and requires extraordinary maintenance to keep it operating. One of the justifications for the FAA modernization program is just that: age of equipment and supportability. The FAA has implemented several interim projects, notably in the terminal and enroute radars, to sustain and enhance current automated air traffic control equipment. These projects were necessitated because of failures of radar equipment in high traffic areas. Fortunately, no major accidents occurred and the interim fixes are working, but the cost of the programs necessitated reallocation of funds from other modernization projects.

Second, there is great demand being placed on the system to safely increase the numbers of aircraft operations handled throughout the system. The first way to achieve this is to improve the efficiency of operations – to get the every ounce of capacity increase out of the current method of controlling traffic. This "efficiency initiative" has been on going for several years and we now find ourselves faced with airline schedules predicated on VFR arrival rates which are obviously not always achievable. We also see ever increasing pressure to utilize innovative operating techniques to increase system capacity.

The interim upgrades mentioned above were not only made to make the computer systems more reliable and maintainable but also to allow the TRACONS to handle increased

traffic. Additional interim projects are in planning to overcome hardware and year 2000 problems and these will drive the cost higher. In regard to the innovative operating techniques, we are working with FAA and industry on means to safely obtain capacity where appropriate until some of the Free Flight enhancements become reality.

The long-range solution is the future operational concept of Free Flight in which the national airspace system will transition from ground-based air traffic control (using analog radios, navigational beacons and radar) to more collaborative air traffic management based on digital communication, satellite navigation, and computer-aided decision support tools for controllers and pilots. The FAA NAS Architecture will achieve Free Flight with the desired safety, efficiency and capacity that the aviation industry, and indeed the county, must have to support our economic growth.

Third, industry and government are attempting to be more proactive than reactive to broaden their efforts in pursuit of an 80% reduction in accidents by 2007. All have a shared responsibility and commitment and contribution to the goal and the FAA's is to insure that the equipment needed to achieve greater efficiency and capacity, while raising the safety standards, is in place. Please note that I said raise the safety standards; not maintain the current level of safety.

The Gore Commission noted that a five-fold reduction in the fatal accident rate could be achieved in the next decade given the right resources and focus. Modernization of the air

traffic control system can play an important role in achieving this reduction. This will require the combined efforts of government and industry on three objectives: preventing equipment malfunctions; reducing human-centered mishaps; and ensuring separation between aircraft and other air or ground hazards. The FAA modernization plan is aimed at reducing equipment malfunctions and ensuring separation. The intent of my comments is that a chain of events usually causes accidents, any one of which if broken would have prevented the accident. The modernization plan will eliminate many of the potential links in the chain.

Human error is still the leading cause of accidents today. For each new procedure or piece of new hardware or software supplied to Free Flight between now and the year 2010, there will also be a new interface with humans to be considered. Free Flight human factors will impact every part of aviation -- from the way pilots are trained and licensed, to the way airplanes are built and certified for flight.

Therefore, the largest operational factor in Free Flight may not be the change in hardware, software or procedure, but in the way humans are affected by this change. To understand this point, consider that present technological applications contain everything from automatic landing systems to automatic checklists. These applications range from replacing human action in a system to simply reducing workload.

In Free Flight, however, the task of proper application of automation is more elaborate

because whole components of today's ground systems will be replaced with new highly automated systems thereby adding new human factors issues to address. ALPA's human factor concerns begin with how this change will impact the cockpit. For example, when the majority of past accidents were attributed to human error, designers reasoned that some type of automation could be used to prevent such occurrences. They rushed to employ automation as a supplement to the many pilot activities, in the belief that a reduction in human involvement in the cockpit would reduce human caused accidents. Still, while today's lower accident rate can in part be attributed to the successful advances in technology, such as Ground Proximity Warning Systems (GPWS) and Traffic Alert and Collision Avoidance System (TCAS), the percentage of accidents and incidents attributed to human error has remained virtually unchanged for the past three decades.

What such statistic tells us is that the man/machine interface -- the human factor element of automation -- has not been utilized in a manner which best addresses safety and efficiency. This is primarily because automation has not been applied in a manner which would produce the best results. Secondly, training has not been implemented in the manner that produces the best results from automation applications.

If we are to reverse the trend of human error accidents, there must be a new review of system, design and training philosophy. This review should embrace automation as a mechanism for complementing human abilities, while compensating for human limitations in the pursuit of overall flight safety. With careful planning and execution Free Flight can

provide automated systems which fulfill this requirement.

To be effective, Free Flight automatic devices must be able to provide good information to the pilot and controller. They must constantly update and display the most recent information. Furthermore, they must be able to identify system failure and suggest alternatives. Most of all, this new system of automation must be predictable to the average pilot and controller. In that sense, automation must become a tool that the pilot and controller can depend on.

In an attempt to address the human factors issues associated with Free Flight, FAA and NASA have signed a Memorandum of Understanding (MOU) which among other things commits NASA considerable human factors expertise to this issue. However, it is critical that this expertise be properly employed by FAA and maintained by NASA if we are to be successful.

The solution to the three problems outlined above is the NAS Architecture (currently Version 4) that is the road map for modernization. The Architecture's main areas of focus are Communications, Navigation, Surveillance, Avionics, and Automation. It has been a labor-intensive project to get the plan in place and manage the inevitable changes to it. The key to progress has been the close collaboration of FAA and industry to ensure that the goals are correct and meet the user needs.

ALPA views Free Flight Phase I as a necessary step in the orderly modernization of our ATC system. We also view it as a compromise due to budget constraints. It is a collection of programs that FAA and industry have agreed are absolutely essential in order to get the modernization process going. There are many more programs and projects underway which support the Free Flight Action Plan, however, the programs in Free Flight Phase I are the absolute minimum necessary to have a real modernization program.

Data link will eventually become the primary communication tool in a modernized ATC system. Without this tool we will not be able to carry out our plans which provide the capacity and efficiency gains associated with modernization. But most importantly to us, data link has the potential to significantly enhance safety. Statistically, misunderstood or garbled communications is the leading cause of incidents in the ATC system. Data link, properly employed, has the potential to eliminate the vast majority of these incidents. For this reason alone we would be strong supporters of data link.

Similar to data link the Global Position System (GPS) will provide capacity and efficiency benefits. It also has significant safety benefits not only domestically, but also internationally. The key to these benefits is proper transition to this new navigation system. Many ALPA members remain unconvinced that GPS by itself will provide the necessary safety margins, however, through the transition period to GPS we believe we will have ample opportunity to assess this issue and take appropriate action.

One of the mechanisms that Congress could help put in place to ensure that FAA can successfully implement ATC modernization is a guaranteed funding stream. In order to meet the financial commitment needed to enhance the safety of our system and to modernize it; there must be a fundamental change in the funding philosophy. It is not realistic to believe that the traditional budget process can fund all of the work contained in the Architecture. As ALPA has often stated in past testimony, we strongly support the principle of spending each and every dollar collected in the Airport and Airway Trust Fund for its intended purpose. This has not been the case in the past, as under-spending from this fund has kept our aviation system from obtaining numerous needed safety and capacity improvements in a timely fashion. We believe that the federal government can and should exercise greater accountability to the traveling public and the aviation industry by ensuring that all trust funds, not just a portion of them, are expediently appropriated to deserving programs and projects.

The Aviation Trust fund was set up for improving the system and must be used for its intended purpose. Without the additional funding available from the Trust Fund, the modernization plan is in danger of falling behind schedule.

In summary, we believe that system modernization is essential in order to maintain safety standards and perhaps obtain safety improvements in line with FAA and industry goals. We also believe that Free Flight Phase I, data link and GPS are all critical components and necessary first steps in beginning our system modernization program. And finally we are

convinced that without an adequate funding stream that allows development of hardware, software, procedures and training programs, this modernization program will flounder. Proper use of the Aviation Trust Fund can provide this funding.

Thank you Mr. Chairman for this opportunity to present ALPA's views to you today, and I would be pleased to respond to any questions you and the Subcommittee may have.

Summary of Statement by Mr. John O'Brien, Director Engineering & Air Safety Department, Air Line Pilots Association, Modernization of Air Traffic Control (ATC) System, March 25, 1999.

- ALPA believes there are three prime reasons for modernization of the Air Traffic Control System.

- They are: 1) age of the existing equipment; 2) demand for increased capacity; 3) increased Safety.

- ALPA believes that human factors will play a significant role in the development of procedures and training in order to achieve the capacity benefits of Free Flight.

- Without a dedicated human factors effort, the safety benefits of Free Flight will not be realized.

- ALPA views Free Flight Phase I as a necessary component of an orderly modernization program.

- ALPA believes data link will become the primary communication tool in a modernized ATC system and a key safety enhancement.

- ALPA believes that ATC modernizations will flounder unless Congress provides a reliable funding stream that allows development of hardware, software, procedures and training programs.